

IN THE CLAIMS

Please cancel pending Claims 3, 5 and 9.

Please substitute the following amended Claims 1, 2, 4 and 6 for the pending claims of the same number:

A 7 1. (Amended) A method for filling a mold between at least two time intervals using at least two different pressures to make a cast article comprising the steps of:

(a) providing a molten metal to a casting chamber in fluid communication with the mold, the casting chamber having a supply conduit for introducing a gas into the casting chamber, and the casting chamber having an evacuation conduit for delivering the molten metal from the casting chamber to the mold;

(b) controlling the filling of the mold during a first time interval by delivering the molten metal from the casting chamber to the mold at a first rate by supplying the gas to the casting chamber at a first pressure, the first pressure operative to move the molten metal from the casting chamber to the mold and to impart a first kinetic energy to the molten metal, the first rate operative to produce a first stage actual fill profile; and

(c) controlling the filling of the mold during a second time interval by delivering the molten metal from the casting chamber to the mold at a second rate by supplying the gas to the casting chamber at a second pressure which is greater than the first pressure, the second pressure operative to impart a second kinetic energy to the molten metal, the second kinetic energy of the molten metal being less than the first kinetic energy of the molten metal, the second rate operative to produce a second stage actual fill profile;

wherein the filling of the mold decelerates from the first rate to the second rate, the second rate does not exceed the first rate, and the second rate is selected to enable the kinetic energy of the molten metal to be dissipated in a selectively controlled manner when the filling of the mold decelerates from the first rate to the second rate thereby reducing the turbulence in the filling of the mold with the molten metal during the change from the first rate to the second rate.

A7 2. (Amended) The method of claim 1 further comprising the step of providing a controller for controlling the first rate and the second rate.

A8 4. (Amended) A method for filling a mold to make a cast article comprising the steps of:

(a) providing a molten metal to a casting chamber, the casting chamber having a supply conduit for introducing a gas into the casting chamber, and the casting chamber having an evacuation conduit for delivering the molten metal from the casting chamber to the mold;

(b) providing a transducer and a controller;

(c) during a first time interval controlling the filling of the mold by introducing the gas into the casting chamber at a first rate by supplying the gas to the casting chamber at a first pressure, the first pressure operative to move the molten metal from the casting chamber to the mold and to impart a first kinetic energy to the molten metal, the first rate operative to produce a first stage actual fill profile; and

(d) during a second time interval controlling the filling of the mold by introducing the gas into the casting chamber at a second rate by supplying the gas to the casting chamber at a second pressure which is greater than the first pressure, the second pressure operative to impart a second kinetic energy to the molten metal, the second kinetic energy of the molten metal being less than the first kinetic energy of the molten metal, the second rate operative to produce a second stage actual fill profile;

wherein the transducer sends a signal representative of the pressure in the casting chamber and the controller changes the filling of the mold from the first rate to the second rate and wherein the filling of the mold decelerates from the first rate to the second rate, the second rate does not exceed the first rate, and the second rate is selected to enable the kinetic energy of the molten metal to be dissipated in a selectively controlled manner when the filling of the mold decelerates from the first rate to the second rate thereby reducing the turbulence in the filling of the mold with the molten metal during the change from the first rate to the second rate.

6. (Amended) A method for filling a mold to make a cast article comprising the steps of:

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- (a) providing a molten metal to a casting chamber, the casting chamber having a supply conduit for introducing a gas into the casting chamber, and the casting chamber having an evacuation conduit for delivering the molten metal from the casting chamber to the mold;
 - (b) providing a desired fill profile for delivering the molten metal from the casting chamber to the mold;
 - (c) detecting the pressure in the casting chamber;
 - (d) providing a controller and sending a signal representative of the pressure in the casting chamber to the controller; and
 - (e) changing the desired fill profile based upon the signal representative of the pressure in the casting chamber;

wherein the desired fill profile includes at least controlling the filling of the mold during a first time interval by delivering the molten metal from the casting chamber to the mold at a first rate by supplying the gas to the casting chamber at a first pressure, the first pressure operative to move the molten metal from the casting chamber to the mold and to impart a first kinetic energy to the molten metal, the first rate operative to produce a first stage actual fill profile, and controlling the filling of the mold during a second time interval by delivering the molten metal from the casting chamber to the mold at a second rate by supplying the gas to the casting chamber at a second pressure which is greater than the first pressure, the second pressure operative to impart a second kinetic energy to the molten metal, the second kinetic energy of the molten metal being less than the first kinetic energy of the molten metal, the second rate operative to produce a second stage actual fill profile, wherein the filling of the mold decelerates from the first rate to the second rate, the second rate does not exceed the first rate, and the second rate is selected to enable the kinetic energy of the molten metal to be dissipated in a selectively controlled manner when the filling of the mold decelerates from the first rate to the second rate thereby reducing the turbulence in the filling of the mold with the molten metal during the change from the first rate to the second rate.